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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,359	04/02/2004	Su Lin Oon	70040110-1	2554
57299	7590	07/23/2007		
Kathy Manke Avago Technologies Limited 4380 Ziegler Road Fort Collins, CO 80525			EXAMINER LOUIE, WAI SING	
			ART UNIT 2814	PAPER NUMBER
			MAIL DATE 07/23/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/817,359	Applicant(s) OON ET AL.	
	Examiner Wai-Sing Louie	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4,6-10,14 and 18-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,6-10,14 and 18-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 6, 9-10, 14, and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller-Mach et al. (US Pub. 2003/0006702) in view of Brunner et al. (US Pub. 2004/0188697).

With regard to claims 1 and 21-22, Mueller-Mach et al. disclose a phosphor light-emitting device (paragraph [0021] et seq. and fig. 3) comprising:

- A blue light-emitting device 12 that emits blue light with peak wavelength 470 nm (paragraph [0032]);
- An epoxy material 38 placed over the light-emitting device 12 (paragraph [0032]), the epoxy material including:
 - A first type phosphor 40, where the first type of phosphor, when excited, emits red light (paragraph [0040]);
 - A second type phosphor 22, where the second type of phosphor, when excited, emits yellow light (paragraph [0040]). Mueller-Mach et al. disclose the light-emitting device is a blue light-emitting diode (paragraph [0032]) and the yellow phosphor is YAG:Ce (paragraph [0036]), but do

not disclose the yellow is $\text{Tb}_3\text{Al}_5\text{O}_{12}:\text{Ce}$ or $\text{Sr}(\text{Ba},\text{Ca})\text{SiO}_4:\text{Eu}$. However, Brunner et al. disclose the yellow phosphor is $\text{Tb}_3\text{Al}_5\text{O}_{12}:\text{Ce}$ (Brunner paragraph [0091]). Brunner et al. provide a motivation that the $\text{Tb}_3\text{Al}_5\text{O}_{12}:\text{Ce}$ phosphor has proven to be efficient phosphor (Brunner paragraph [0091]). Therefore, it would have been obvious to one of ordinary skill in the art to modify Mueller-Mach's device with the teaching of Brunner et al. to provide a $\text{Tb}_3\text{Al}_5\text{O}_{12}:\text{Ce}$ yellow phosphor in order to have an efficient phosphor.

With regard to claim 4, in addition to the limitations disclosed in claim 1 above, Mueller-Mach et al. disclose an optical dome 24 covering the epoxy 38 (fig. 3).

With regard to claims 6 and 18, in addition to the limitations disclosed in claim 1 above, Mueller-Mach et al. disclose the red phosphor is $(\text{CaS}):\text{Eu}^{2+}$ (paragraph [0040]).

With regard to claims 9 and 19, Mueller-Mach et al. modified by Brunner et al. disclose a printed circuit board 8 (Brunner paragraph [0072]) and a lead frame 11 and 12 (Brunner fig. 1).

With regard to claims 10 and 20, Mueller-Mach et al. modified by Brunner et al. disclose a circuit board substrate 8 (Brunner paragraph [0072] and fig. 3).

With regard to claim 14, in addition to the limitations disclosed in claim 1 above, Mueller-Mach et al. also disclose:

- A holding means 38 for holding a first and second type of phosphors adjacent to the LED 12 (fig. 3).

With regard to claim 23, Mueller-Mach et al. modified by Brunner et al. disclose the phosphor particles size is between 2 to 20 μm (Brunner paragraph [0093]).

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller-Mach et al. (US Pub. 2003/0006702) in view of Marshall et al. (US 6,513,949).

With regard to claims 7-8, Mueller-Mach et al. do not disclose a second LED. However, Marshall et al. disclose a second LED with epoxy phosphors mixture (Marshall fig. 2). Marshall et al. provide a motivation, which is the second LED exhibits improved performance over conventional LED lighting system (Marshall col. 1, lines 6-12). Therefore, it would have been obvious at the time the invention was made to modify Mueller-Mach's device with the teaching of Marshall et al. to include second LED with epoxy phosphors mixture in order to have an improved performance hybrid lighting system. Mueller-Mach et al. modified by Marshall et al. disclose a third LED with epoxy phosphors mixture (Marshall fig. 3).

Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller-Mach et al. (US Pub. 2003/0006702) in view of Soules et al. (US 6,252,254).

With regard to claim 24-25, Mueller-Mach et al. do not disclose the first phosphor comprises $\text{BaGa}_4\text{S}_7:\text{Eu}$. However, Soules et al. disclose a phosphor comprises $\text{BaGa}_4\text{S}_7:\text{Eu}$ that emits green light (Soules col. 4, lines 25-32). Soules et al. provide a motivation, which $\text{BaGa}_4\text{S}_7:\text{Eu}$ phosphor, combining with red phosphor, can produce white light with pleasing characteristic at a color rendering index of about 83-87 (Soules col. 2, lines 17-32). Thus, it would have been obvious at the time the invention was made to modify Mueller-Mach's device with the teaching of Soules et al. to provide a $\text{BaGa}_4\text{S}_7:\text{Eu}$ phosphor in order to produce white light with pleasing characteristic at a color-rendering index of about 83-87.

Response to Arguments

Applicant's arguments filed 5/1/2007 have been fully considered but they are not persuasive.

- Applicant argues that there is no suggestion or motivation to combine Mueller-Mach et al. and Brunner et al. (page 7 and 8 of the remarks). However, Brunner et al. provide a motivation that the $\text{Tb}_3\text{Al}_5\text{O}_{12}:\text{Ce}$ phosphor has proven to be efficient phosphor (Brunner paragraph [0091]). Brunner et al. has named the $\text{Tb}_3\text{Al}_5\text{O}_{12}:\text{Ce}$ phosphor is the best suitable phosphor for converting the blue light into yellow light. With this motivation, there is a reason to combine Mueller-Mach et al. and Brunner et al.
- Applicant has pointed a typo error by the Examiner, where the reference Soules instead of Mueller-Mach et al. (page 7 of the remarks). However, the rejection of claims 7-8 is correct.
- Applicant argues that Mueller-Mach et al. disclose a conventional LED lighting system with a single phosphor-LED (page 8 of the remarks). However, claim 1 is a conventional LED lighting system with a single LED surrounded by two types of phosphors and claim 7 claims a second LED in the same lighting package. Claim 8 depends on claim 1, which claims a third LED in the same lighting package. Marshall et al. disclose all the deficiencies of Mueller-Mach et al. and provide a motivation, which is the second LED improves the performance over

conventional LED lighting system (Marshall col. 1, lines 6-12). Therefore, the combination of Mueller-Mach et al. and Marshall et al. for claims 7-8 is proper.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (571) 272-1709. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



WAI-SING LOUIE
PRIMARY PATENT EXAMINER

Wsl
July 16, 2007.